Universidad Pública de Navarra
Nafarroako Unibertsitate Publikoa

Facultad de Ciencias Económicas y Empresariales

TRABAJO FIN DE GRADO EN
DOBLE GRADO INTERNACIONAL
ADE Y ECONOMÍA

THE EFFECTS OF WIDOWHOOD ON THE SPOUSE'S LABOR SUPPLY. DO THESE VARY WITH GENDER?

Historia Económica y Desarrollo

Teresa de Arístegui
Rebeca Echavarri

Pamplona-Iruña, 10 de Mayo de 2019

ABSTRACT

Losing a partner is one of the major challenges a person ever faces. Being a widow/widower in working age may force individuals to change their participation in the labor market. The most popular belief is that widowed spouses will increase their labor supply after losing their partner. However, empirical findings indicate that the assumption of a positive relationship between widowhood and labor supply is not true for every scenario, and there is little coverage of this phenomenon in the literature. To fill this gap, we present a simple model that shows how gender does affect the labor responses of the spouses to widowhood. Moreover, we focus on working-age individuals, commonly ignored in widowhood-centered studies. Our estimates provide support for the differing responses of men and women in the event of widowhood. Moreover, these responses further vary with children. Thus, gender and the type of family nucleus are of great importance when studying individuals' response to widowhood. This study contributes to the literature by examining the labor supply response of widowed spouses of working age, focusing on gender differences. One central implication is that the pension plan in Spain might fail to adequately meet the needs of those experiencing the loss of their partner, since their labor supply responses vary greatly depending on their family situation.

KEY WORDS

Widowhood, labor supply, employment, gender differences, pensions.

TABLE OF CONTENTS

1. INTRODUCTION *4*

2. LITERATURE REVIEW *5*

3. CONCEPTUAL FRAMEWORK. *8*

4. WIDOWHOOD IN SPAIN *9*

4.1. Widowers and Widows pension status in Spain. 10

4.2. Death and Survivors' Benefits. (Widow/Widower pensions). 10

4.3 Unemployment. 11

4.4 Main occupations in Spanish Labor Market. 12

5. EMPIRICAL FRAMEWORK. *13*

5.1 Identification Strategy 13

5.2 The Estimation Method 16

5.3. The Data. 16

5.4 Variable Measurement and Definition. 17

6. EMPIRICAL RESULTS *19*

6.1. Descriptive analysis 19

6.2 Results for labor outcome using full sample 21

6.3 Results for labor supply using the subsample of women 24

7. DISCUSSION AND CONCLUDING REMARKS. *26*

8. REFERENCES *29*

9. APPENDIX *32*

1. INTRODUCTION

The purpose of this study is to shed some light on the effect of suffering a negative life shock, especially the effect of experiencing widowhood, on the labor supply decisions of working age individuals. Since policy makers in Spain have recently emphasized the importance of the benefit plans (see e.g. Pension Spending in Spain - OECD 2019), the findings of this study can contribute to the on-going policy debate in Spain. Moreover, society is placing a great emphasis on the gender gap lately, but they forget that these gender gap can be found and should be eradicated at every life step. Thus, gender gap should not only be addressed to comment on salaries' differences among men and women, but also any difference that is found in the behavior and responses of those. One of these cases is that of widowhood.

From a theoretical point of view, the impact of such an unplanned event on an individual's labor supply seems to be straight-forward: since losing a partner (generally) results in lower household income, the surviving spouse ought to increase his/her participation in the labor market. However, empirical evidence shows ambiguous results, including the possibility that losing a partner tends to lower the labor supply of the survivors. Most studies find a negative impact of widowhood on labor force participation of the partner. There are, in fact, not many studies contemplating this marital status, widowhood. Therefore, using data from the Spanish 2011 Census (INE), we want to determine which labor supply direction is followed by Spanish widows[1] and widowers.

This study aims at analyzing the relationship between widowhood and employment behavior of surviving spouses in Spain on the basis of data from the most recent census (INE, 2011). We follow a simple model in order to estimate spouse's labor supply contrasting the different marital statuses. Therefore, not only do we study the effect of widowhood on the spouse's labor supply, but also compare this to the labor supply of those undergoing a divorce or marriage as well as those being single. The purpose is to isolate women only, in order to better evaluate whether there are still gender differences related to this matter present in our

[1] The term widow stands for a widowed woman. A widower is the term used to refer to a widowed man.

country. Finally, we extend the study to see whether having children influences the response that both widows and widowers have to losing their partner.

In contrast to already available studies related to the effect of negative shocks on one's labor supply, we do find a significant gender effect of widowhood on the employment status of the surviving spouse. Women (widows) are more likely to decrease their participation in the labor market than men (widowers). However, when the couple has children to take care of, the response that the parents exhibit is the opposite: widows and widowers with children see their labor supply increase after losing their partner.

2. LITERATURE REVIEW

There are many events that shape our labor supply decisions, and our marital status is indeed one of them. Being married, divorced or a widow directly affects the number of hours worked by each partner. Montalto and Gerner (2016) examined the effect of expected changes in marital status on labor supply decisions of women and men, arriving to the conclusion that these decisions depend on the previous expectations that women and men have of future marital status changes. Others, such as Williamson and McNamara (2002) focused their research on the effect of unplanned changes in marital status on the labor supply participation. They found that workers who experience unplanned events are prompt to exit the labor force earlier than they otherwise would have, with potentially adverse consequences for their subsequent socioeconomic status.

When studying the labor supply model, both positive and negative shocks are important, even though literature focuses on situations that are usually deemed negative. Some of the commonly studied topics are: the effect of divorces on labor supply and the effect of a deterioration on the spouse's health on one's own labor supply. One group of researchers represented by Berkowitz et al. (1976) and Lambrinos (1981) arrived at the conclusion that when the husband's health deteriorates, the direction of the labor supply adjustment by the wife is ambiguous, proposing a new theoretical strand of thought. On the one hand, potential family income is reduced, and this tends to lower the marginal value of time spent at home by the wife, which induces her to spend more time working in the market. On the other hand, after the event of worse health, the husband may require nursing care, which raises the

value of the wife's home time and leads her to spend less time engaged in market work. Therefore, there are two possible responses to a deterioration of the husband's health.

In contrast, the available empirical research finds that worse partner's health leads to an increase in female's labor supply. This is supported by Parsons (1977) and Theeuwes (1981), who found that wives with husbands in poor health tend to work more time or have higher probability of participating in the labor force than those with healthy husbands. Similarly, Trevisan and Zantomio (2015) used data from 16 European countries to prove that wives who are strongly attached to the labor force are likely to remain so over time in the event of a deterioration of their husband's health status. Therefore, both studies provide empirical support for a negative relationship between partner's health and female labor supply.

Besides a deterioration in the health status of the spouse, there are other variables that negatively affect the labor supply. Changes in marital status appear to be the order of the day. These vary in nature, such as divorces or widowhood. The greatest part of the literature covers the effects of divorce on the partners labor supply. Moreover, we know that the extent to which shocks on marital status affects one's labor supply changes with family assets, education etc. Family characteristics are decisive when undergoing life changes. For instance, having children tends to preempt parents from exiting the labor force after a shock in the marital status.

When analyzing the effects of widowhood on the surviving spouses, we can predict that this life shock affects differently men and women. There are many reasons that account for this fact. First, age at marriage is crucial when having to estimate the probability of being a widow/widower in the future. The older the man a woman marries, the more probabilities she has of becoming a widow. The opposite, that a man marries a woman much older than him, also holds true. Second, life expectancy can very well explain why this phenomenon is more commonly suffered by women than by men. Ahn (2004) found that the proportion of widowhood among the studied population aged 65 and more was 31%. This author pointed out that the widowhood proportion between men and women is substantially different. For example, the proportion of widowhood is 2.2% among men aged 50-64 compared to 10.1% among the same aged women, and 13.6% among men aged 65 and older compared to 45% among women of the same age group.

Most of the studies that address this social reality tend to focus on the psychological and emotional impact on the surviving spouse (Umberson et al, 1992; Thierry, 1999), while others study effects on the household income and risk of poverty (Li, 2004; Bernard, 2006). These researchers observe the evolution from the previous marital status to the new one, widowhood, in terms of all the negative implications: psychological, physical and economic. If we look at the consequences related to the household income, studies support that income reduction upon widowhood is in general larger among widows (women) than widowers (men). The gender difference is largest in Denmark, Spain, Austria and Finland, where widowers enjoy more than 30% higher income than widows (Ahn, 2014).

When analyzing the psychological effects, some studies find that these also differ by gender. Studies by Grootheest, Beekman, Groenou and Deeg (1999) concluded that widowhood is associated with higher levels of depressive symptoms and that this association is stronger for men than for women. The effect of widowhood is mediated by different types of environmental strain for men and women. However, a strong direct main effect of widowhood on depression remains. The difference in depression rates between men and women is most evident among those widowed for a longer period. Thus, it appears that, over time, women adapt to widowhood more successfully than men. From a clinical point of view this is important, as it suggests that men who remain alone after losing their partner are at a higher risk of developing symptoms of chronic depression. Similarly, a substantial body of evidence indicates that widowhood is associated with declines in health and increases in mortality risk for surviving spouses (Martikainen & Valkonen, 1996; Mineau, Smith, & Bean, 2002; Schaefer, Quesenberry, & Wi, 1995; Stroebe & Stroebe, 1987; Zick & Smith, 1996).

Those researchers who attempted to study the impact of widowhood on the spouse's labor supply also differ in their findings, presenting two possible responses to this negative shock. Haurin (1989) and other authors defend the position that smaller effects are noted for widowhood, husband's unexpected unemployment or health change than compared to those experienced after a divorce. Moreover, this author stated that the difference in responses between widowhood and divorce (controlling for family assets, hence inheritances) is unexplained, leaving room for further analysis. The other possible response to the economic loss associated with death of a spouse is to increase labor supply (Weir and Willis, 2009).

Some authors already studied the relationship between labor force participation and marital status. Pang, de Brauw, and Rozelle (2004) as well as Connelly, Maurer-Fazio, and Zhang (2014) carried out studies among China's rural elders and found that widowhood reduces labor force participation. These authors concluded that apart from education, the strongest predictors of labor force participation for rural Chinese elders are age, widowhood, among others. Age certainly reflects health limitations which can affect the ability to work. But age also appears to have a cultural component: the steepness of the age gradient differs between men and women and, for men especially, by minority status. Widowhood can also be thought of as having a cultural component, as it seems to be part of the definition of being "too old" to work. Furthermore, widowhood reduces the probability of positive hours of farm work for women, but not men. Thus, there is an external factor associated to gender that we ought to analyze.

In order to provide a satisfactory coverage of this phenomenon, we will investigate if such controversial empirical evidence can be reconciled by taking into account gender effects. By examining the Spanish 2011 Census Data, we will give an answer to the question whether the impact of widowhood on the labor supply of the spouse changes by gender. Unplanned events prompt workers to exit the labor force earlier than expected, but does this hold true for both men and women? With this, we will have a better understanding on how negative shocks affect the labor supply decisions of people. This is very interesting and necessary to bear in mind, as Governments and firms should be aware of the different forces that drive people's decisions and behavior, such as labor supply changes caused by widowhood.

3. CONCEPTUAL FRAMEWORK.

There are many ways in which widowhood can affect the surviving spouse, especially in the absence of policies that effectively help to palliate both the economic and psychologic instability caused by such a negative life shock. When evaluating the direct response observed in the labor market participation, different factors influence the path chosen by the partner.

As a first response, the surviving spouse can choose to increase the supply of labor, in order to ameliorate the household's financial situation. This decision is frequently observed among widows, whose economic situation significantly worsens in the event of losing their husband.

This result was presented by Berger and Fleisher (1984). A similar conclusion was drawn from Weir and Willis (2009), stating that this shock forces them to either enter the labor force, or increase the labor supplied.

In a second possible scenario, widows and widowers may opt to decrease the number of hours supplied at work. This is particularly true for partners whose family characteristics contribute to reducing the responsiveness to this loss (Haurin, 1989). In addition, this is also the case for households with children (Connelly and Kimmel, 2003). The surviving parent must then reorganize the time spent on housework and child care.

Therefore, both responses seem possible after undergoing such terrible event. However, there appears to be a tendency towards gender differences. Put another way, women (widows) are often to increase their participation in the labor market after losing their husband. This is not true for their male counterparts, widowers. The final effect in Spain is subject to empirical analysis, thus, the aim of this study is to explore if these responses to widowhood effectively vary with gender.

4. WIDOWHOOD IN SPAIN

Ahn (2004) analyzed the economic consequences of widowhood in Europe, focusing on cross country and gender differences. Among the main results obtained, she noticed that, by gender, income reduction upon widowhood is in general larger among widows than widowers. Moreover, she stated that this gender difference is largest in Denmark, Spain, Austria and Finland. In these countries, widowers enjoy more than 30% higher income than widows. Women in these places opted to be wives and mothers who worked at home, raised children and did not participate in the labor market. Therefore, their main source of income in the event of widowhood is the survivorship pension, leading to a significantly worse economic situation when losing their partner, since these pensions do not cover the loss of the husband's income.

This, according to Ahn, is especially true in the northern countries as well as ours. Regarding the case of Spain, it is of great importance to examine the situation of the Spanish population with respect to the labor market, in order to better understand the possibilities that both men and women face when experiencing widowhood (widowers and widows, respectively). Graph

1 in the appendix depicts the distribution of the Spanish individuals of working age by marital status, which gives an insight on the overall marital status evolution in the last 20 years.

4.1. Widowers and Widows pension status in Spain.

Over 90% of the recipients of the survivorship pension are women, while widowers still account for a minority group (Seguridad Social, 2019). In Spain, widowhood is present in a very defined profile (both in gender and age), it being mostly women over 70 years old. Moreover, the most common age group receiving the pensions is the 85 years old and over. (Seguridad Social, 2017)

The average pension under widowhood amounted to 647.35€ in 2017 in Spain, and it is expected to increase in the current year 2019, according to the Government. Social Security estimated the number of Spanish widows and widowers at 2.361.830 people in 2017. Widows (women) make up over 92% of this number (2.181.317 widows vs. 180.480 widowers), receiving most of the survivor's benefits. (Seguridad Social, 2017)

The average age of Spanish widowers is 73 years, while widows' mean age lies around 77. In addition, over 700.000 widows and widowers are over the age of 85 and receive an average pension of 593 euros. This type of contributions represents an elevated amount of money. Graph 2 in the appendix depicts the public budget distribution, where pensions represent over 40% of the government budget as of 2019. Spain, moreover, is located above the OECD average in pension spending (see Graph 3 in the appendix).

4.2. Death and Survivors' Benefits. (Widow/Widower pensions).

The 'death and survivor pension' is mostly received by women in Spain and has as main objective: to offset the economic loss caused by the partner's death. Those who are or have been legitimate spouses of the dead will be entitled to a pension, if and only if they have not remarried or constituted a civil partnership. Those who, under specific conditions, were together with the person concerned at the moment of the death, as an unmarried couple, will also be entitled to a pension. In addition, those spouses who have had children (both own or adopted), will be entitled to a pension supplement, which will depend on the number of children of the couple before the event causing the pension.

There is a different type of pension, a temporary pension. The allowance will be granted during two years in the event of death from a common disease to those who have been

married for a period shorter than a year, and thus are not entitled to an annuity. The right to receive these type of pensions (permanent and temporary) will terminate when the beneficiary remarries or constitutes an unmarried couple, or in the case of receiving a temporary pension, when this one terminates.

The question to examine is whether these benefits are enough for widows/widowers to offset the economic loss caused by the death of the spouse. As already mentioned, Ahn (2005) found that, by gender, living-alone widows in The Netherlands, Spain and Austria suffer a much larger economic difficulty then their male counterpart. This fact will provoke a need to participate in the labor market among widowed women, but what is the situation that these widows face in the Spanish labor market? We will overview it in the following paragraphs.

4.3 Unemployment[2].

The actual unemployment rate in Spain is 14,45% (January 2019), 7% lower than 3 years ago (January 2016). This trend depicts quite a favorable situation, as it is far from the levels reached after the economic crisis, with a maximum of 27.16% in the first quarter of 2013.

Similarly, the evolution of the number of unemployed (or jobless) in Spain can be subject of analysis. The number of unemployed markedly increased with the start of the current year, breaking with the decreasing trend followed in the previous years. There are 3.285.761jobless in Spain (INE, 2019).

There exists, indeed, a difference between the unemployment rate for Spanish men and women. While the first experience a rate of unemployment of 12.87%, the latter have a much higher unemployment rate: 16.26%. Therefore, it is critical to note that women are either less employed or more passively looking for opportunities in the labor market.

Not only this is applicable to the unemployment rate but the same holds true for the number of unemployed in Spain. There are approximately 1.925.313 unemployed women in Spain, with a monthly variation of 3.23%. Similarly, there are 1.360.448 unemployed men in Spain, showing a monthly variation of 1.74%. Therefore, we know that men experience less

[2] On the one hand, unemployment refers to the situation of actively looking for employment, but not being currently employed. On the other hand, the unemployment rate is a measure of the prevalence of unemployment and it is calculated as a percentage by dividing the number of unemployed individuals by all individuals currently in the labor force.

unemployment than women in Spain, both in real and percentage terms. Next, we will contemplate the different occupations held by women and men in the country, which may help explain the gender pay gap that the country exhibits.

4.4 Main occupations in Spanish Labor Market.

There are many factors that determine the gender segregation in various sectors and occupations. These are present in the demand and supply sides of the labor market and in external factors (such as social and cultural). For instance, data shows that women account for a large percentage of the labor supply in sectors such as: health, education and retail industry. Men, however, hold most executive positions and manual tasks. Moreover, evidence supports the mismatch between the level of studies attained by women and their professional situation and occupations (INE, 2019).

To this day, there still are considerable differences between the characteristics and conditions of work for men and women, both from the demand and supply labor market perspective. This only reinforces the gender gap in wages, occupation responsibilities, distribution of family obligations, participation in unpaid work, effect of children on the parents' labor supply.

In 2019, the minimum wage in Spain increased to 1,050 € per month, that is 12,600 euros per year, taking into account 12 payments per year (Country Economy, 2019). The median[3] salary was equal to 19,228 EUR per year in 2016, which means that half (50%) of the population were earning less than 19,228 EUR yearly, while the remaining half of the population were earning less than 19,228 EUR (INE, 2016).

In Spain, the average household net-adjusted disposable income per capita is lower than the OECD average, as it is 20.807€ a year, compared to 27.321€ a year. There is a considerable gap between the richest and poorest – the top 20% of the population earn close to seven times as much as the bottom 20% (OECD, 2019).

These numbers, however, differ by gender. The gender pay gap is one of the problems faced by most of the European countries, which should as well be tackled at a European level. Spain, for instance, presents a difference between the full-time earnings of men and women

[3] The median represents the middle salary value.

close to 11.5%, being one of the countries that exhibits widest gender pay gap. Put another way, women earn 11,5% less than men earnings (Eurostat), and this fact increases with age.

Therefore, what the future apparently holds for Spanish widows differs greatly from the future ahead of Spanish widowers. The first will see their economic situation worsen after losing their husband, which might force them into the labor market. However, the current situation of the Spanish labor market is not favorable enough to tackle the expected demand of labor from the widowed women.

5. EMPIRICAL FRAMEWORK.

5.1 Identification Strategy

This section describes the identification strategy used. In the study, what is understood as a negative life shock suffered by an individual is the exogenous nature of widowhood. We analyze the response to this negative life shock with respect to the individuals' labor outcome. More specifically, outcome stands for both the labor supply of the individual (whether he or she is actively participating in the labor market) and the employment regime the individual exhibits (part-time or full-time job). The study is comprised of 7 regressions that we hereby describe and present.

Then, the baseline econometric model is given by the next equation:

$$\boldsymbol{y_{i,p} = \alpha + \beta_1 F_{i,p} + \beta_2 W_{i,p} + \beta_3 M_{i,p} + \beta_4 D_{i,p} + XB + \varepsilon_{i,p}} \qquad \textbf{(1)}$$

where $y_{i,p}$ represents the outcome of individual i in province p ; F_i represents individual i's gender, $\boldsymbol{W_{i,p}}$ represents if individual i in province p is a widow/widower, $\boldsymbol{M_{i,p}}$ represents if individual i in province p is married, $\boldsymbol{D_{i,p}}$ represents if individual i in province p is divorced, X is a vector of control variables and $\varepsilon_{i,p}$ is the error term.

The interpretation of this equation is the following:

$\boldsymbol{\alpha}$ = average labor supply of single men

$\boldsymbol{\beta_1}$ = represents the difference in average labor supply between single men and single women.

$\boldsymbol{\beta_2}$= represents the difference in average labor supply between single men and widowers (men).

$\boldsymbol{\beta_3}$ = represents the difference in average labor supply between single men and married men.

$\boldsymbol{\beta_4}$ = represents the difference in average labor supply between single men and divorced men.

In order to complete the baseline econometric model, we introduce an interaction between widowhood and gender. This term will enable us to study the outcome of widowed women, thus, widows.

$$\boldsymbol{y_{i,p} = \alpha^I + \beta^I{}_1 F_{i,p} + \beta^I{}_2 W_{i,p} + \beta^I{}_3 M_{i,p} + \beta^I{}_4 D_{i,p} + \beta_5 F_{i,p} W_{i,p} + XB^I + \varepsilon^I{}_{i,p}} \quad \textbf{(2)}$$

where $\boldsymbol{\beta_5}$ represents the difference-in-difference effect of widowhood and gender. That is, the effect of widowhood on female.

Accordingly, we now add the interactions of every civil status with gender, which allows us to examine increased effects by sex.

$$\boldsymbol{y_{i,p} = \alpha^{II} + \beta^{II}{}_1 F_{i,p} + \beta^{II}{}_2 W_{i,p} + \beta^{II}{}_3 M_{i,p} + \beta^{II}{}_4 D_{i,p} + \beta_5^I F_{i,p} W_{i,p} + \beta_6 F_{i,p} M_{i,p} + \beta_7 F_{i,p} D_{i,p} + XB^{II} + \varepsilon^{II}{}_{i,p},} \quad \textbf{(3) and (4)}$$

where $\boldsymbol{\beta_6}$ represents the difference in difference effect of married and gender and $\boldsymbol{\beta_7}$ represents the difference in difference effect of divorce and gender. Regression (3) focuses on the labor supply of the individual i in province p, whereas regression (4) studies individual i's employment regime.

Because males might fail to be a reliable control group for females because of coherent cultural and biological differences, from this point onwards, we only focus on female individuals, setting the control group as single females. Therefore, the baseline econometric model for the study of woman responses is:

$$\boldsymbol{y_{i,p} = \gamma_0 + \gamma_1 W_{i,p} + \gamma_2 M_{i,p} + \gamma_3 D_{i,p} + X\Upsilon + \nu_{i,p},} \quad \textbf{(5)}$$

where $y_{i,p}$ represents the labor supply of woman i in province p ; $\boldsymbol{W_{i,p}}$ represents the civil widowhood status of woman i in province p, $\boldsymbol{M_{i,p}}$ represents the married status of woman i

in province p, $\boldsymbol{D_{i,p}}$ represents the divorced status of woman i in province p, X is a vector of control variables and $\varepsilon_{i,p}$ is the error term. This error term captures all other factors except marital status that might affect the labor supply of women.

The interpretation of this equation is the following:

$\boldsymbol{\gamma_0}$ = average labor supply of single women.

$\boldsymbol{\gamma_1}$ = represents the difference in average labor supply between single women and widowed women.

$\boldsymbol{\gamma_2}$ = represents the difference in average labor supply between single women and married women.

$\boldsymbol{\gamma_3}$ = represents the difference in average labor supply between single women and divorced women.

Again, in order to complete the baseline, we include the key demographic outcome variable that will depict the influence of having children on women's outcome.

$$\boldsymbol{y_{i,p} = \gamma'_0 + \gamma'_1 W_{i,p} + \gamma'_2 M_{i,p} + \gamma'_3 D_{i,p} + \gamma_4 C_{i,p} + X\Upsilon' + \nu'_{i,p},} \quad \textbf{(6)}$$

where $\boldsymbol{C_{i,p}}$ represents the number of children of woman i in province p. and parameter $\boldsymbol{\gamma_4}$captures the effect of fertility on labor decisions.

Now, we include three interactions that relate the different civil statuses with women's fertility. We will thus be able to study the responses of women who have children (6) and compare it with those who do not (3).

$$\boldsymbol{y_{i,p} = \gamma''_0 + \gamma''_1 W_{i,p} + \gamma''_2 M_{i,p} + \gamma''_3 D_{i,p} + \gamma'_4 C_{i,p} + \gamma_5 W_{i,p} C_{i,p} + \gamma_6 M_{i,p} C_{i,p} + \gamma_7 D_{i,p} C_{i,p} + X\Upsilon' + \nu'_{i,p}} \quad \textbf{(7)}$$

The interpretation of the interaction parameters in this equation is the following:

$\boldsymbol{\gamma_5}$ = represents the difference in difference effect of widowhood and fertility.

$\boldsymbol{\gamma_6}$ = represents the difference in difference effect of marriage and fertility.

$\boldsymbol{\gamma_7}$ = represents the difference in difference effect of divorce and fertility.

5.2 The Estimation Method

We will employ a linear regression analysis. With it, we will first summarize the data, then, we will evaluate conditional predictions, and will finally test the role of some specific regressors of interest. Moreover, after examining the testing the OLS, since this is the simplest econometric regression, we will secondly conduct a Logit in order to correct for the nature of the dependent variable. The results will not be displayed in this paper but will be provided upon request. Moreover, all the regressions are computed using the corresponding sample weights, as indicated by the INE.

5.3. The Data.

We analyze the labor supply situation of Spanish individuals of working age who suffered from a negative marital status shock named widowhood. The data for this analysis is that obtained through the 2011 Spanish Census of Population and Housing (Censo de Población y Vivienda 2011). This data source represents the most reliable source, as it is gathered and constructed by the National Statistics Institute (INE), every 10 years. The population of our interest are Spanish individuals aged 16 to 65.

This source includes information relative to all buildings, households and population. The latter includes variables relative to the demographic information of the population (e.g. gender, age, marital status, place of birth, nationality, number of children), unpaid work (such as domestic chores and social volunteering), information relative to the level of education, the occupation, the activity and the "type of family nucleus" and of households in general. Our model uses cross-sectional data, that is, widely dispersed data relating to one period (year 2011 for our case), which means that there is no variation due to time.

A wide range of the literature, especially those papers with purposes similar to mine, is based on the Spanish Census. One of these papers, by Alaminos and Ayuso (2015), used the 2011 Census with the aim of studying the pension system in Spain. A more recent one, for instance that of Abellán, Ayala, Pérez and Pujol (2018), studied the situation of the elderly in Spain. Thus, even though our study will not entail the same variables, the need of using sound and credible data is of great importance. This is the reason why we will use the 2011 Spanish Census of Population and Housing.

5.4 Variable Measurement and Definition.

The equations presented in section 4.2 are the basis of our model. This model includes several variables. As mentioned, there are two main outcomes under study: first, the labor supply of individuals, which differentiates between being employed (actively participating in the labor force) and not employed. Second, the type of contracts of employed individuals, which distinguishes between part-time and full-time employed. The following table presents the measurement and definition of the full list of variables used in this study. The order followed in the variable description is that presented by the census, and not by importance.

Table 1 – Variable measurement and definition.

Variable	**Definition**	**Authors that employed it**
Female	Dummy variable that takes value 1 when individual i is female, and 0 otherwise.	Choné, P & Le Blanc, D & Robert-Bobée, I. (2004)
Widow	Dummy variable that takes value 1 when individual i is widow (woman) or widower (man), and 0 otherwise.	Ahn, Namkee. (2004)
Married	Dummy variable that takes value 1 when individual i is married, and 0 otherwise.	Mark C. Berger and Belton M Fleisher (1984). Blau and Kahn (2007)
Divorced	Dummy variable that takes value 1 when individual i is divorced, and 0 otherwise.	Houle, R., Simó, C., Solsona, M., & Treviño, R. (1999)
Labor Supply	Dummy variable that takes value 1 when individual i is employed, and 0 otherwise.	Gamero Burón (2007)

Parttime	Dummy variable that takes value 1 when individual i is a part-time employee, and 0 otherwise.	Rachel Connelly & Jean Kimmel (2003)
Fertility	Discrete variable. Number of children of the mother.	Choné & Le Blanc & Robert-Bobée (2004)
Province of Birth	Discrete variable. Values 1 to 52 depending on the province of birth of individual i. This will be represented by a set of dummies.	Plaza (1993)
Province Code	Discrete variable. Values 1 to 52 depending on the province where individual i lives. This will be represented by a set of dummies.	Plaza (1993)
Work at home	This dummy variable will take a value 1 if the individual i works at home, and a 0 otherwise.	Casado-Díaz (2000)
Work in municipality	This dummy variable will take a value 1 if the individual i works in the municipality where he/she lives, and a 0 otherwise.	Casado-Díaz (2000)
Work in other municipalities or other country	This dummy variable will take a value 1 if the individual i works in a different municipality or country than where he/she lives, and a 0 otherwise.	Casado-Díaz (2000)
Female Family nucleus	This dummy variable will take a value 1 when the nucleus comprises a mother with children, and 0 otherwise.	Fernandes, Reichert, Monteiro, Freitas Júnior, Cardoso, Ronque and de Oliveira (2010)

Male Family nucleus	This dummy variable will take a value 1 when the nucleus comprises a man with children, and 0 otherwise	Fernandes, Reichert, Monteiro, Freitas Júnior, Cardoso, Ronque and de Oliveira (2010)
Age	Discrete variable. Number of years of individual i. Working age (16-65) only.	Mueller (2005) ; Trevisan and Zantomio, (2015)
Age Difference	Dummy variable that takes value 1 if female is at least 1 year older than male, 0 otherwise.	Lehrer (2006)

6. EMPIRICAL RESULTS

6.1. Descriptive analysis

The following section includes a brief description of the main variables used in this study. Presented in the table are the minimum and maximum values that each variable exhibit, as well as the mean and standard deviations.

Table 2 - Descriptive Statistics.

Variable Name	Min	Max	Mean	Std. Dev.
Labor Supply	0	1	0.550	0.497
Female	0	1	0.500	0.5
Widow	0	1	0.021	0.143
Married	0	1	0.550	0.497
Divorced	0	1	0.038	0.192
Age of individual	16	65	41.963	13.58
Age difference of the couple	0	1	0.122	0.328
Fertility	1	20	2.017	0.914

Part-time	0	1	0.079	0.269
Work at Home	0	1	0.070	0.255
Work in municipality	0	1	0.272	0.445
Work in other municipalities	0	1	0.253	0.435
Mother Family nucleus	0	1	0.091	0.287
Father Family Nucleus	0	1	0.023	0.151

Table constructed from data obtained from the Census and STATA.

Over 55% of the population in our sample are actively participating in the labor force or employed. Among these, around 50% are women, which is consistent with demographic outcomes. The average age of the individuals is close to 42 years. As we observe in the table, 31,17% of the individuals are mothers with children. The average number of children that these women have is 2. In addition, we can observe the following: almost 10% of the households entail a mother with children, while only 2% gather a father with children.

When looking at the classification by marital status, we find that 2.1% of the individuals registered in the census are widows/widowers, and thus, have lost their partner/spouse. Over 55% of them are married, and almost 4% are divorced. The remaining are, therefore, single. Those who do have a partner/spouse exhibit different ages between them. What we observe is that only 12% of the couples have the woman as the oldest of the two.

When analyzing the place of work of the individuals, we see that the majority of employed people work in the same municipality where they live (27,25%), others work either in a different municipality or in a different country (25,1%), while some are able to work from home (7%). Moreover, only 7,85% of the individuals are part-time employees.

6.2 Results for labor outcome using full sample

Table 3 - OLS estimation of labor supply responses to widowhood.

Sample of Spanish individuals aged 16-65, Spain, 2011.

	Dependent variable: Labor Status			
Regressors:	(1) Employed	(2) Employed	(3) Employed	(4) Part-time
female	-0.102*** (0.001)	-0.101*** (0.001)	-0.005*** (0.001)	0.048*** (0.001)
married	0.126*** (0.001)	0.126*** (0.001)	-0.214*** (0.001)	-0.003***(0.001)
divorced	0.078*** (0.003)	0.078*** (0.003)	0.057*** (0.004)	0.006** (0.002)
widow	-0.195***(0.004)	-0.173*** (0.007)	-0.106*** (0.007)	-0.004 (0.003)
Female*Married			-0.179*** (0.002)	0.039*** (0.001)
Female*Divorced			0.030*** (0.006)	0.028***(0.003)
Female*Widow		-0.028*** (0.007)	-0.154*** (0.009)	-0.033***(0.004)
constant	0.554*** (0.001)		0.513*** (0.001)	0.099***(0.001)

Notes: In this table, the dependent variable is the labor outcome of the individual. Regressions (1)-(3) study the labor status of Spanish individuals at working age (16-65). Regression (4) covers the type of contract that these individuals exhibit, whether it is part-time or full-time. Since our variables of interest are dummies, columns present the likelihood of being actively participating in the labor force (regressions (1)-(3)) or being part-time employed (4). The standard errors for the estimations are in parenthesis. The estimation employs the OLS model. The p-value associated with this test informs if the variables are statistically significant. * $p < .01$; ** $p < .005$; *** $p < .001$. The regressions include the following control variables: age, age difference between partners, province of birth fixed effects, province of residence, place of work and type of family nucleus.

This first regression allowed us to initiate the desired analysis. Starting by the constant, what we see is that little over 55% of the control group, that we set as "single men", are actively participating in the labor market. By looking at the dummy for females, we find that today, single women are 10% less likely to be in the labor force than single men ($p<0.01$). Thus, the first civil status analyzed (single men and women) exhibit different labor supply statuses. Next, we take the age difference and observe that when the woman is older than the man, this has a positive impact on being on the labor force, statistically significant at $p<0.01$.

If we now take a closer look at the different civil statuses, we see that being married increases the probability (in 12,6%) of taking part in the labor force ($p<0.01$). The same holds true for divorced individuals, who see their labor force participation increase in almost 8% ($p<0.01$). However, when studying the labor supply of widows and widowers we can predict the following: being a widow/widower reduces the labor force participation by almost 20% ($p<0.01$). Therefore, it is easy to find that widowhood is the only civil status that refrains individuals from working, since we are studying individuals in working age only.

The interaction between gender and widowhood introduced in regression (2) gave us the option to analyze whether widows react different than widowers. Put another way, introducing this iteration enabled us to search for different behavioral responses by gender after suffering the loss of a partner. Thus, concerning widowhood, the estimates suggest that being a widow (women who lost her husband/partner) decreases the probabilities of being in the labor force by 3%, compared to their male counterparts, at a 1% significant level. Therefore, widowers are likely to reduce their participation in the labor force by 17%, while widows reduce it by 3% more, thus, 20%.

The three interactions added in regression (3), which combine gender with the three civil statuses, permit us to see whether the last regression, which revealed that widows supply less labor than widowers, holds true for the other two civil statuses as well. In this case, the following can be deduced from the table: widowhood has a negative relationship with labor supply for both women and men, even though widows are less prone than widowers to participating in the labor force after losing their partner ($p<0.01$). Divorce, same as in the first regression, shows a positive relationship with respect to labor supply, and it appears to be more positive for divorced women than divorced men by 3% ($p<0.01$). However, the same cannot be said about marriage. While marriage initially had a positive correlation with

labor supply, we find that married women tend to work less (18%) than married men ($p<0.01$).

Regression (4) explores the same variables, being the outcome of the individual the employment regime (part-time labor contract). Thus, the dummy variable called part time will explore the participation in the labor force under a part time schedule, instead of full-time participation. From the table above, we can deduce the following: The constant (which represents the control group, single men) depicts that 10% of single men are involved in part-time jobs. Moreover, single women are 5% more prone to have part-time contracts than their male counterparts. Moreover, widowhood and marriage are negatively correlated with part-time labor supply. However, divorce is positively correlated with part-time contracting. This means that divorced individuals are more likely to be working part-time than widows/widowers or married individuals.

If we do look at the interaction of these civil statuses with the female dummy, we find that while widows are even less likely to work part-time than widowers, married women are actually to work part time. In a similar line, divorced women appear to be more involved in part-time jobs.

6.3 Results for labor supply using the subsample of women

Table 4 –OLS estimates of equations (5)-(7) using subsample of women.

	Dependent variable: Labor status		
Regressors:	(5) Employed	(6) Employed	(7) Employed
Married	0.035*** (0.001)	-0.002 (0.002)	0.058*** (0.005)
Divorced	0.088*** (0.004)	0.077*** (0.005)	0.133*** (0.010)
Widow	-0.259*** (0.005)	-0.181*** (0.005)	-0.191*** (0.011)
Fertility		-0.054*** (0.001)	-0.024*** (0.002)
Fertility*Married			-0.035*** (0.002)
Fertility*Divorced			-0.034*** (0.005)
Fertility*Widow			0.005 (0.005)
Constant	0.509*** (0.002)	1.002*** (0.004)	0.953*** (0.001)

Notes: In this table, the dependent variable is the labor outcome of the individual. Regressions (1)-(3) study the labor status of Spanish individuals at working age (16-65). Regression (4) covers the type of contract that these individuals exhibit, whether it is part-time or full-time. Since our variables of interest are dummies, columns present the likelihood of being actively participating in the labor force (regressions (1)-(3)) or being part-time employed (4). The standard errors for the estimations are in parenthesis. The estimation employs the OLS model. The p-value associated with this test informs if the variables are statistically significant. * $p < .01$; ** $p < .005$; *** $p < .001$. The regressions include the following control variables: age, age difference between partners, province of birth fixed effects, province of residence, place of work and type of family nucleus.

Table 4 focuses on the subsample of women, which allows us to analyze the labor supply responses that women have when facing life changes. Following the previous regressions, we first start by analyzing the control group in regression (5), single women, which shows that 51% of single women aged 16 to 65 are in the labor force. Among women, we see that similarly, two out of three civil statuses reveal a positive relationship with labor supply: marriage and divorce. Being married increases the probability of being in the labor force by 3,5% ($p<0.01$), while being divorced does so by 9% ($p<0.01$). However, just as seen before,

widows exhibit lower participation in the labor market, and being a widow lowers women's probability of supplying labor by over 25%, which is statistically significant at 1%.

It is of great interest to highlight that, unlike married and divorced women, the behavior of widows with children is similar to single women (who have no children). However, the difference fails to be statistically significant.

In this new regression, regression (6), we include the number of children (fertility) in order to see whether having to look after children changes the direction or the extent of the labor supply response to experiencing a negative life change. As it could be expected, the more the number of children a woman has, the less they participate in the labor market. Put another way, each child that a woman has decreases the woman's labor supply participation in over 5%, being this estimation statistically significant at 1%. In the last regression we include several interactions, which relate the number of children with the civil status of the women under evaluation. This way, we can see how the effect of children changes the labor supply response to being categorized in any of the 4 civil statuses. Thus, we aim to see if individual under different marital statuses who have children have a different response than those who do not have children in terms of supplying labor.

Therefore, we compare the results separately. Marriage and divorce show positive correlation with respect to supplying labor. However, when looking at the correlation of those variables with fertility, (interaction between marriage and fertility as well as divorce and fertility), we can see that the correlation becomes negative. Married women who have children are less likely to participate in the labor force. This is also true for women who have children and are divorced, who see their labor participation reduced by 3% ($p<0.01$). Moreover, just as described before, widowhood and labor supply are negatively correlated. What is striking, though, is that widows who have children are more likely to actively take part in the labor market. Even though the probability of participation is very low (below 1%), this result demonstrates that having children changes the response that any woman would have when having no children.

7. DISCUSSION AND CONCLUDING REMARKS.

Once we analyzed the different regressions conducted in our study, we are now able to summarize the various findings. On the one hand, our conclusions are in line with previous studies which supported that there is a negative relationship between experiencing negative life shocks and female labor supply (Trevisan and Zantomio, 2015). Similarly, Williamson and McNamara (2002) found that workers who experience unplanned events are prompt to exit the labor force earlier than they otherwise would have. In our analysis, rather than focusing on general negative life shocks (unplanned events), we focus on experiencing the loss of one's partner/spouse. The results, however, are the same as those obtained by the just mentioned authors in the literature.

Previous literature, moreover, supported the fact that widowhood causes large changes on the survivor's behavior and life (Trivedi, Sareen and Fhvani, 2009). Controlling for other socioeconomic and cultural factors that might explain the labor supply of individuals of working age, the expected response of widows and widowers is a decrease in their supply of labor. Put another way, widows and widowers are less likely to participate in the labor market than single, married and divorced individuals under the same socioeconomic and cultural characteristics. However, if they have children, the behavior of female widows is similar to single women.

We first summarize the results obtained by civil status and by gender, where the main findings reveal that more than half of the single individuals of working age (both men and women) are actively participating in the labor force. However, gender differences can be found at this level too, since single women are less likely to supply labor than single man. Married individuals are, in fact, estimated to supply more work than single individuals. In this case, married women also supply less labor than their male counterparts. When comparing this to divorced individuals, the results are quite similar. Divorce, same as marriage, shows a positive relationship with respect to labor supply, but it appears to be more positive for divorced women than divorced men. Finally, as stated in the latter paragraph, widows and widowers see their labor supply decrease, showing lower rates of participation than any other marital status. However, widowhood also understands gender differences, revealing that widows (women) supply less labor than their male counterparts (widowers). Thus, our estimates support the argument that widowhood might decrease the supply of labor of the survivor

spouse at any working age and for both genders. Therefore, the only time women work more (are more active in the labor market) is when they are divorced.

Secondly, we ought to realize that there are differences between the labor supply responses of men (widowers) and women (widows). Therefore, when responding to our question of analysis: "the effects of widowhood on the spouse's labor supply, do they vary with gender?" we can state that there exist gender differences in the way people react to losing their partner. Thus, our research question is answered and backed up with statistically significant estimations. Not only the OLS regressions support this idea, but also the Logit regression conducted gives our findings greater robustness. All the results obtained and presented have been affirmed and accepted by the Logit regression conducted. Thus, not only the estimates are statistically significant, but they also show robustness.

Thirdly, we should comment on another important finding related to children. According to the estimates obtained, the number of children held by women, as many authors already supported, has a direct effect on the individuals' labor market participation (Angrist and Evans[4],1998). Our estimates are in line with the literature, stating that women's labor supply varies more than men's labor supply in the presence of children.

The present paper contributes to the literature on labor supply responses to unplanned events by demonstrating the need to give support to those who, apart from suffering the loss of their loved one, ought to cope with economic and family adversities that refrain them from participating in the labor force. Our findings show that differences are not only present among the different civil statuses, but other factors as having children, and thus, the type of family nucleus, are of great importance when observing different behaviors with respect to the labor supply of the individuals.

Among the main reasons supporting our findings we find that the positive relationship between marriage and labor supply can be accounted for by the fact that married couples are generally willing to buy a house, or at least have to incur in rental costs. Moreover, these couples have children to sustain, which also increases the household costs. In the case of married women, we find that many women opt to leave the workplace and stay at home

[4] Their estimates consistently show that the labor market consequences of childbearing are more likely to be severe for poor and less educated women. Equally important is their finding that husbands change their labor-market behavior very little in response to a change in family size.

when they start creating a family. Moreover, Spain is thought to be a country with traditional values and customs, which support (at least until recently), the fact that women would work at home (coping with domestic work) and men would bring the money home and sustain their family members (Poduval and Poduval, 2009). Finally, we believe that the positive relationship between divorce and labor supply can be explained by the need for women to cope with the income loss caused by the divorce.

While further research is needed, the main point is that the response to the difficult event of widowhood is generally negative, both in personal and professional terms, as was first expected. Future work in this field and that of sociology will be needed to give further detail about all the possible implications of this event. Moreover, the fact that widows and widowers exhibit differing behaviors could somewhat be overcome if complementary measures (psychological along with labor insertion, for instance), were implemented along with economic benefits that survivors receive (covered in Section 4.2). Finally, we encountered a few limitations in our model, being the main one the little amount of literature covering this specific matter, which could have served as a baseline when conducting our study. Moreover, our findings hold true for the population of our interest, which does not imply that the behavior manifested by the Spanish individuals aged 16 to 65 can be applied to the behavior of those from a different country.

8. REFERENCES

Alaminos, Estefania & Ayuso, Mercedes. (2015). "Una estimación actuarial del coste individual de las pensiones de jubilación y viudedad: Concurrencia de pensiones del Sistema de la Seguridad Social español". Estudios de Economía Aplicada. 33. 817-838.

Angrist, J., & Evans, W. (1998). "Children and Their Parents' Labor Supply: Evidence from Exogenous Variation in Family Size". The American Economic Review, 88(3), 450-477. Retrieved from http://www.jstor.org/stable/116844

Ayuso, L. (2012). "Las redes personales de apoyo en la viudedad en España / Personal Networks Supporting Widowhood in Spain". Reis, (137), 3-24. Retrieved from http://www.jstor.org/stable/41336847.

Balkwell, Carolyn. (1981). "Transition to Widowhood: A Review of the Literature". Family Relations. 30. 117. 10.2307/584245.

Catherine Phillips Montalto & Jennifer L. Gerner (1998) "The Effect of Expected Changes in Marital Status on Labor Supply Decisions of Women and Men", Journal of Divorce & Remarriage, 28:3-4, 25-51

Choné, P & Le Blanc, D & Robert-Bobée, I. (2004). "Female Labour supply and child care". 162. 23-50.

Eckstein, Z., & Lifshitz, O. (2011). "DYNAMIC FEMALE LABOR SUPPLY". Econometrica, 79(6), 1675-1726. Retrieved from http://www.jstor.org/stable/41336534.

Elisabetta Trevisan, Francesca Zantomio (2016), "The impact of acute health shocks on the labour supply of older workers: Evidence from sixteen European countries", Labour Economics, Volume 43, 2016, Pages 171-185, ISSN 0927-5371, https://doi.org/10.1016/j.labeco.2016.04.002.

Haurin, Donald. (1989). "Women's Labor Market Reaction to Family Disruptions". The Review of Economics and Statistics. 71. 54-61. 10.2307/1928051.

Houle, R., Simó, C., Solsona, M., & Treviño, R. (1999). "Análisis biográfico del divorcio en España". Reis, (88), 11-35. doi:10.2307/40184202

Instituto Nacional de Estadística (2019), "Labour market" Retrieved March 20, 2019, from http://www.ine.es/dyngs/INEbase/en/categoria.htm?c=Estadistica_P&cid=1254735976594

J. M. Casado-Díaz (2000) "Local Labour Market Areas in Spain: A Case Study", Regional Studies, 34:9, 843-856, DOI: 10.1080/00343400020002976.

Kristi Williams (2004), "The Transition to Widowhood and the Social Regulation of Health: Consequences for Health and Health Risk Behavior", The Journals of Gerontology: Series B, Volume 59, Issue 6, November 2004, Pages S343–S349, https://doi.org/10.1093/geronb/59.6.S343

Lehrer, E.L. J Popul Econ (2008) 21: 463. https://doi.org/10.1007/s00148-006-0092-9.

Maczulskij, T. & Böckerman, P. (2018) "Harsh times: do stressors lead to labor market losses?". The European Journal Health Economics (2018). https://doi.org/10.1007/s10198-018-1002-2.

Mark C. Berger, Belton M. Fleisher (1984), "Husband's health and wife's labor supply", Journal of Health Economics, Volume 3, Issue 1, 1984, Pages 63-75, ISSN 0167-6296, https://doi.org/10.1016/0167-6296(84)90026-2.

Maurer-Fazio, Margaret and Hughes, James W. and Zhang, Dandan (2005), "Economic Reform and Changing Patterns of Labor Force Participation in Urban and Rural China" (August 2005). William Davidson Institute Working Paper No. 787. Available at SSRN: https://ssrn.com/abstract=904002 or http://dx.doi.org/10.2139/ssrn.904002

Mueller, Richard E.(2005), "The Effect of Marital Dissolution on the Labour Supply of Males and Females: Evidence from Canada". Journal of Socio-Economics, Vol. 34, No. 6, 2005. Available at SSRN: https://ssrn.com/abstract=2256078.

Nakamura, Alice & Nakamura, Masao. (1983). "Part-Time and Full-Time Work Behaviour of Married Women: A Model with a Doubly Truncated Dependent Variable". Canadian Journal of Economics. 16. 229-57. 10.2307/134998.

Namkee Ahn (2004), "Economic Consequences of Widowhood in Europe: Cross-country and Gender Differences", No 2004-27, Working Papers, FEDEA.

Plaza Acero, Raquel (1993) "Análisis de las diferencias interprovinciales del desempleo en España". Cuadernos de economía 21.60: 121-136.

Poduval, J., & Poduval, M. (2009). "Working mothers: how much working, how much mothers, and where is the womanhood?" Mens sana monographs, 7(1), 63–79. doi:10.4103/0973-1229.41799

Pujol, Ayala, Pérez & Abellán. (2018). "Un perfil de las personas mayores en España, 2015". Indicadores estadísticos básicos.

Rachel Connelly & Jean Kimmel (2003) "Marital status and full–time/part–time work status in child care choices", Applied Economics, 35:7, 761-777, DOI: 10.1080/0003684022000020841.

Radl, Jonas & Himmelreicher, Ralf. (2015). "The Influence of Marital Status and Spousal Employment on Retirement Behavior in Germany and Spain". Research on Aging. 37. 10.1177/0164027514536403.

Rebecca M. Blank (1988), "Simultaneously Modeling the Supply of Weeks and Hours of Work among Female Household Heads," Journal of Labor Economics 6, no. 2 (Apr. 1988): 177-204.

Trivedi, J. K., Sareen, H., & Dhyani, M. (2009). "Psychological aspects of widowhood and divorce". Mens sana monographs, 7(1), 37–49. doi:10.4103/0973-1229.40648

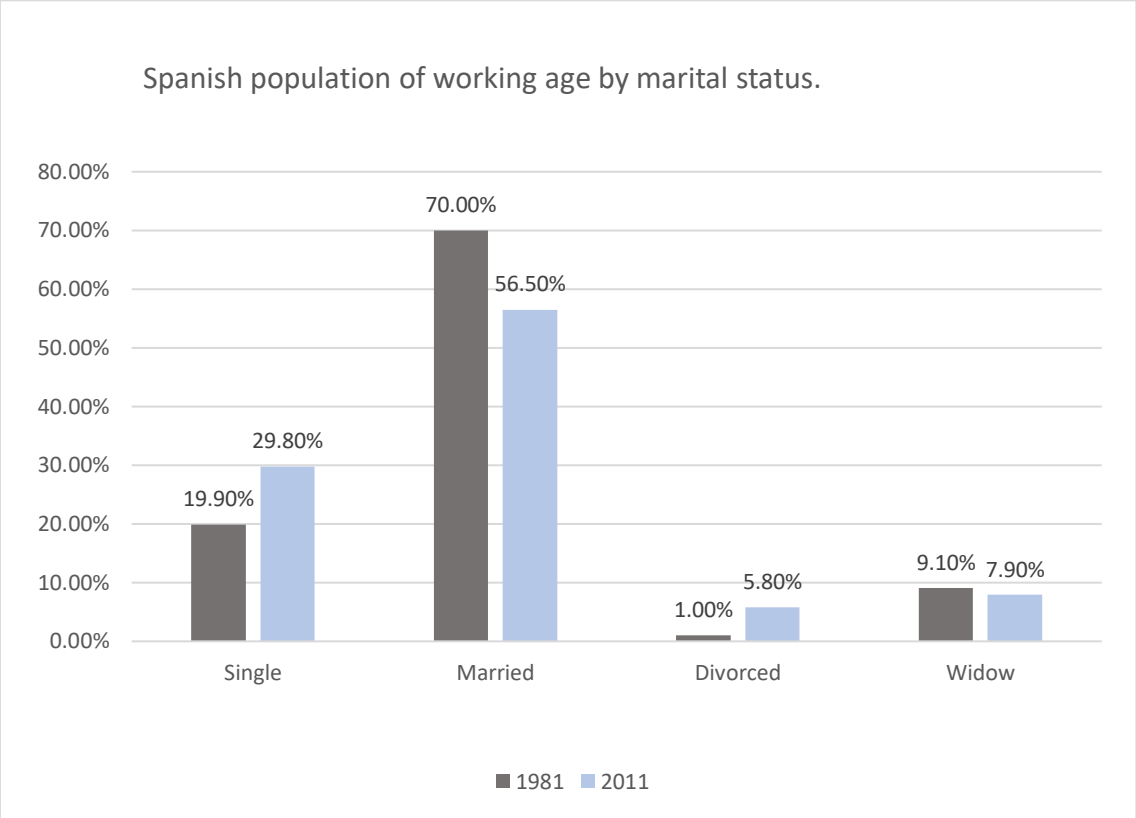
Van Grootheest, D., Beekman, A., Broese van Groenou, M. et al. (1999) "Sex differences in depression after widowhood. Do men suffer more?" Social Psychiatry and Psychiatric Epidemiology (1999) 34: 391. https://doi.org/10.1007/s001270050160

Williamson, John B. and McNamara, Tay K. (2002), "The Effect of Unplanned Changes in Marital and Disability Status: Interrupted Trajectories and Labor Force Participation" (2002). Center for Retirement Research at Boston College Working Paper No. 2002-05.

Katharina Wrohlich, (2004), "Child Care Costs and Mothers' Labor Supply: An Empirical Analysis for Germany", No 412, Discussion Papers of DIW Berlin, DIW Berlin, German Institute for Economic Research.

9. APPENDIX

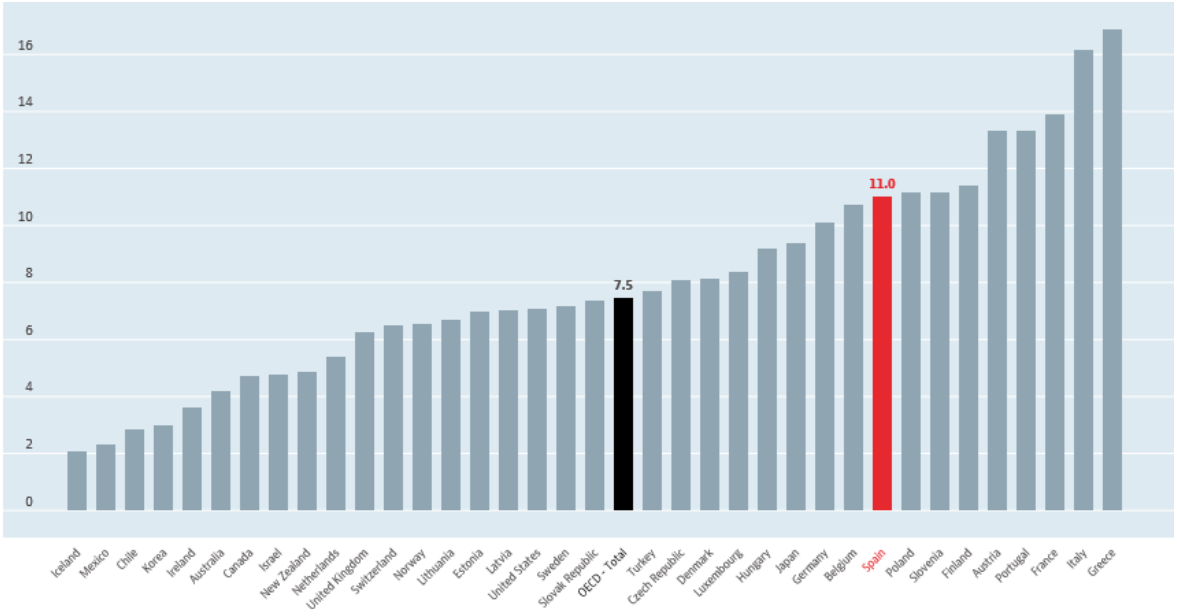
Graph 1 - Spanish Population of working age by marital status, 1981-2011.



Graph 2 – Distribution of Public Spending in Spain, in percentages (2019)

Source: Government of Spain, January 2019.

Graph 3- Pension Spending indicator by country, 2019.



OECD (2019), Pension spending (indicator).